

WHAT IS CLAIMED IS:

1. A die for die compacting a powdered material, comprising:

- 5 a die body having a penetrating die cavity to which a couple of punches are adapted to apply for pressing the powdered material to be supplied to form a compact, the die cavity being provided with a coating composed of a material which is selected from the group consisting of titanium  
10 carbide, titanium nitride, alumina, titanium cyanide, hafnium nitride, chromium nitride, tungsten carbide and DLC; and

- a die holder having a bore into which the die body is shrink fitted, the die holder being composed of a steel  
15 material which is prepared by tempering at a temperature higher than a treatment temperature at which the coating is provided on the die cavity.

2. The die of claim 1, wherein the die cavity has a  
20 substantially columnar shape excepting that the die cavity is slightly tapered such that the compact formed in the die cavity is ejected from the wider side of the die cavity.

3. The die of claim 1, wherein the die cavity is  
25 tapered at a ratio within a range of 1/5,000 to 1/1,000.

4. The die of claim 1, wherein the die cavity has a substantially cylindrical shape excepting that the die cavity is slightly tapered.

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5. The die of claim 1, wherein the coating is a physical vapor deposition layer or a plasma-used chemical vapor deposition layer.

- 35 6. The die of claim 1, wherein the coating is a single-layer or multi-layers.

7. The die of claim 1, wherein the treatment temperature at which the coating is provided on the die cavity is equal to or lower than 550 degrees centigrade.

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8. The die of claim 1, wherein the steel material of the die holder has a composition comprising, at ratio by mass, 0.2 to 0.6% carbon; 0.15 to 1.2% silicon; 1.2% or less of manganese; 0.03% or less of phosphorus; 0.03% or less of sulfur; 0.4 to 5.5% chromium; at least one of 0.25 to 3.5% nickel, 0.2 to 3.0% molybdenum, 1.0 to 10% tungsten, 2.2% or less of vanadium and 3.8 to 4.5% cobalt; and the balance iron.

9. The die of claim 1, wherein the temperature at which the steel material of the die holder is tempered is equal to or higher than 530 degrees centigrade.

10. The die of claim 1, wherein the steel material composing the die holder is on a grade of steel for hot alloy tool steels or for structural use.

11. A die for compacting a powdered material into a compact, comprising:

a die holder having a bore; and

a die body having a penetrating die cavity to which a couple of punches are adapted to apply for pressing the powdered material to be supplied to form a compact, wherein the die body is shrink fitted into the bore of the die holder before the die cavity is provided with a coating composed of material which is selected from the group consisting of titanium carbide, titanium nitride, alumina, titanium cyanide, hafnium nitride, chromium nitride, tungsten carbide and DLC,

wherein the die holder is composed of a steel prepared by tempering at a temperature higher than a treatment

temperature for providing the coating on the die cavity.

12. A die assembly for compacting a powdered material, comprising:

5 a die unit comprising

a die body having a penetrating die cavity being provided with a coating composed of a material which is selected from the group consisting of titanium carbide, titanium nitride, alumina, titanium cyanide, hafnium nitride, chromium nitride, tungsten carbide and DLC, and

a die holder having a bore into which the die body is shrink fitted, the die holder being composed of a steel material which is prepared by tempering at a temperature higher than a treatment temperature at which the coating is provided on the die cavity; and a couple of punches which are adapted to apply to the die cavity for pressing the powdered material to be supplied into the die cavity to form a compact.